



**Rocky Mountain National Park
Continental Divide Research Learning Center**

Bighorn Population

The Question: What is the abundance and distribution of bighorn sheep in Rocky Mountain National Park? What are the survival rates of bighorn lambs?

The history of Rocky Mountain National Park's native bighorn sheep represents a 150-year battle against extinction. Roughly 1,000 sheep existed in the park when it was established in 1915. Because of inadequate low-elevation winter habitat within the park's boundaries and exotic disease introduced by nearby domestic livestock, sheep numbers dropped off to about 200 by 1970. The population rebounded to nearly 700 in 1989, but anecdotal evidence suggested that sheep abundance declined significantly in the mid-1990s. Pneumonia, which can quickly kill over 50% of a sheep population, was a suspected culprit. Because a formal study of the park's herds had not been conducted since then, the current condition of the park's bighorn sheep was unknown. Park managers wanted to know the current sheep population size and its distribution. Observational data suggested that the bighorn herd on the east side of the park could be in jeopardy so an assessment of both the east- and west-side herds' vitality was also needed.



Bighorn ewe displaying vigilance.

The Project: Radio collar 59 bighorn ewes, and track them over two years using radio telemetry, overflights and ground surveys. Estimate the size of the sheep herds and calculate lamb survival.

Dr. Gary C. White, Brett McClintock, and their crew from Colorado State University captured 59 adult ewes in the park with net-guns during the winters of 2002 and 2003. Researchers attached a radio collar to each ewe and estimated the population size by the mark-resight method. After collaring and releasing into their native habitat, sheep were later relocated by overflights and ground surveys. They collected lamb survival data by visually identifying and counting lambs during the ewe relocation surveys. They analyzed the data with a statistical model called Bowden's Estimator.



Bighorn sheep congregating near Milner Pass.

The Results: Rocky Mountain National Park's total bighorn sheep population in 2004 was approximately 360 sheep. Approximately 24% of lambs born in the park survive at least one year.

A total of 300 sheep make up the three distinct herds west of the Continental Divide. The herds occupy three separate ranges: the North Never Summer Mountains, the South Never Summer Mountains, and along the Continental Divide. The ranges overlap at The Crater, a known mineral lick. A total of about 60 sheep make up the single herd east of the Continental Divide, located exclusively in the Mummy Range. All collared ewes east of the Divide used Sheep Lakes in Horseshoe Park as a mineral lick. Overall at least 37 lambs were born to collared ewes, which resulted in a fertility estimate of 86%. The three-month lamb survival rate was 89%, and the one-year survival rate was 24%.

Although the total 2004 population estimate confirms that the population has declined since 1989, the current population appears to be an average size relative to the historical abundance of sheep in the park. The herd east of the Continental Divide, however, might be approaching its lowest number in the park's recorded history.